MODULE SPECIFICATION

Module code	
Module title in Polish	**Komputerowe Techniki Projektowania Konstrukcji Metalowych**
Module title in English	**Computer Design of Metal Structures**
Module running from the academic year	**2016/2017**

A. MODULE IN THE CONTEXT OF THE PROGRAMME OF STUDY

Field of study	**Civil Engineering**
Level of qualification	**First cycle** *(first cycle, second cycle)*
Studies profile	**Academic** (*academic/practical)*
Mode of study	**Full-time** *(full-time / part-time)*
Specialism	**Building Structures**
Organisational unit responsible for module delivery	**The Department of Mechanics, Metal Structures and Computer Methods**
Module co-ordinator	**Monika Siedlecka, MSc, Eng.**
Approved by	**Marek Iwański, Professor**

B. MODULE OVERVIEW

Module type	**Core module** (*core/programme-specific/elective HES*)*
Module status	**Compulsory module** *(compulsory / non-compulsory)*
Language of module delivery	**English**
Semester in the programme of study in which the module is taught	**Semester 6**
Semester in the academic year in which the module is taught	**Summer semester** *(winter / summer)*
Pre-requisites	**None** (*module code/module title, where appropriate)*
Examination required	**No** *(yes / no)*
ECTS credits	**2**

Mode of instruction	**lectures**	**classes**	**laboratories**	**project**	**others**
Total hours per semester			**30**		

* elective HES − elective modules in the Humanities and Economic and Social Sciences

C. LEARNING OUTCOMES AND ASSESSMENT METHODS

Module aims	The aim of the module is to familiarise students with modern programs, e.g. ROBOT, Rcad Stal, and EXCEL, for engineering calculations and to prepare assembly and working drawings for metals structures.

Module outcome code	Module learning outcomes	Mode of instruction *(l/c/lab/p/ others)*	Corresponding programme outcome code	Corresponding discipline-specific outcome code
W_01	A student knows the selected computer programs supporting calculating and designing structures.	l	B_W17	T1A_W01 T1A_W02 T1A_W05 T1A_W07
U_01	A student can make static calculations of a flat frame for normative loads with the use of the Robot program.	l	B_W17 B_U01	T1A_U08 T1A_U09
U_02	A student can design the elements of a flat frame with the Robot program.	l	B_W17 B_U02 B_U03	T1A_U08 T1A_U11 T1A_U13
U_03	A student can check load bearing capacity of a flat frame according to Eurocode with Excel.	l	B_W17 B_U09	T1A_U03 T1A_U05 T1A_U07 T1A_U09 T1A_U13 T1A_U14
U_04	A student can design a helical connection of a flat frame with the Robot program.	l	B_W17 B_U09	T1A_U03 T1A_U05 T1A_U07 T1A_U09 T1A_U13 T1A_U14
U_05	A student can make the drawings of steel structures with the RCAD program.	l	B_W17 B_U09	T1A_U03 T1A_U05 T1A_U07 T1A_U09 T1A_U13 T1A_U14
K_01	A student can work individually.	l	B_K01	T1A_K01 T1A_K03 T1A_K04
K_02	A student is responsible for the reliability of the obtained results.	l	B_K02	T1A_K02 T1A_K05 T1A_K07
K_03	A student formulates conclusions and describes the results of his/her own work.	l	B_K04	T1A_K01 T1A_K07

Module content:

1. Topics to be covered in the lectures
2. Topics to be covered in the classes
3. Topics to be covered in the laboratories

No.	Topics	Module outcome code
1-2	The principles of work in the Robot Millenium 2D system (system possibilities, available modes of the analysed structures). The convention of signing, a list of shortcuts, the available cursor modes, setting program parameters	U_01 U_02 K_01

	(customisation, menu, unit and accuracy settings of the given results).	K_02
3-4	Sample projects of flat frame structures. Creating a 2D computational model. Particular elements of the defined constructional model (assigning the nodes of the computational model; assigning particular rods; assigning section-geometrical characteristics for bars; degrees of freedom; introducing structure axes). Modifying the assigned computational model with the use of the available program tools (tables, Robot screen system, and structure axes). Using the library of typical structures.	U_01 U_02 K_01 K_02
5-8	A flat two-storey frame structure (static computations). Loads (types of loads, climatic loads, computational coefficients, available tools and the methods of assigning loads for particular elements of the computational model of the assigned structure). Creating combinations (normative ponderations; manual combinations, i.e. user's). Computations and results for the assigned load cases (the diagram of internal forces, displacements, and reactions).	U_01 U_02 K_01 K_02
9-12	Designing of the structure. The definition of a bar (defining buckling length values; defining loads to determine a critical moment). Creating bar groups. Verifying bars. Optimisation. Computations in characteristic points. Manual computations. Complete and shortened results. Designing of the elements of steel structures in the Robot system according to Eurocode 3 – EN1993-1-1:2005.	U_01 U_02 K_01 K_02
13-16	Designing of bolted connections, part 1. Lap connections. Familiarising students with the available connection modules. The definition of a connection. The verification of geometry. The verification of load bearing capacity of connections.	U_04 K_01 K_02
17-18	Designing of bolted connections, part 2. Butt compressed connections. Familiarising students with the available connection modules. The definition of a connection. The verification of geometry. The verification of load bearing capacity of connections.	U_04 K_01 K_02
19-20	Verifying designing of a structure in Excel. Preparing a spreadsheet in Excel for designing of a steel compressed and single-directionally bent element for 2D systems according to PN-EN (method 2).	U_03 K_01 K_02
21-22	Introduction to RCAD-STAL. General program description (system possibilities). Presenting basic elements facilitating work in program.	U_05 K_01 K_02
23-28	Constructional drawings. Creating drawings of steel structures with the use of base of macros as well the definition of offsets.	U_05 K_01 K_02
29-30	Prints of constructional drawings. Creating assembly and workshop drawings of metal structures. The composition of prints.	U_05 K_01 K_02

Assessment methods

Module outcome code	**Assessment methods** *(Method of assessment; for module skills − reference to specific project, laboratory and similar tasks)*
W_01	A report
U_01	A report
U_02	A report
U_03	A report
U_04	A report
U_05	A report
K_01	A report
K_02	A report

C. STUDENT LEARNING ACTIVITIES

ECTS summary		
	Type of learning activity	**Study time/ credits**
1	Contact hours: participation in lectures	
2	Contact hours: participation in classes	
3	Contact hours: participation in laboratories	**30**
4	Contact hours: attendance at office hours (2-3 appointments per semester)	**2**
5	Contact hours: participation in project-based classes	
6	Contact hours: meetings with a project module leader	
7	Contact hours: attendance at an examination	
8		
9	**Number of contact hours**	**32** *(total)*
10	**Number of ECTS credits for contact hours** *(1 ECTS credit =25-30 hours of study time)*	**1.3**
11	Private study hours: background reading for lectures	
12	Private study hours: preparation for classes	
13	Private study hours: preparation for tests	
14	Private study hours: preparation for laboratories	**10**
15	Private study hours: writing reports	**13**
16	Private study hours: preparation for a final test in laboratories	
17	Private study hours: preparation of a project/a design specification	
18	Private study hours: preparation for an examination	
19		
20	**Number of private study hours**	**23** *(total)*
21	**Number of ECTS credits for private study hours** *(1 ECTS credit =25-30 hours of study time)*	**0.9**
22	**Total study time**	**55**
23	**Total ECTS credits for the module** *(1 ECTS credit =25-30 hours of study time)*	**2**
24	**Number of practice-based hours** *Total practice-based hours*	**25**
25	**Number of ECTS credits for practice-based hours** *(1 ECTS credit =25-30 hours of study time)*	**1.7**